DATA PROCESSING DIGEST

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General Information

PICKING THE COMPUTER'S BOSS—A DECISION OF IMPORT

D. Ronald Daniel, McKinsey & Co., New York
MANAGEMENT AND BUSINESS AUTOMATION, March 1959; pages 21-27

Computer installations have tended to be located in either of two situations: under the jurisdiction of the controller where the company sees the computer as being a source of economy of clerical expense, or as an independent staff organization responsible to top management where the company sees its computer as a means of assisting in top-management decision-making.

In the structure of the computer department itself, it is advisable for the analysis and programing functions to be parallel, with good communication between the two groups. The operations function should also have good communication with the programing function. The ideal situation is to have tab operations function as a unit of the computer group--at least those tab operations which are directly tied in with the computer's data processing system. In this way, both quality control and economical machine scheduling can be maintained.

It is well if the computer analysts and programers are members of the systems and methods department, but if this is not possible, they should have their respective duties well defined.

Two illustrative organization charts are shown. In one of these, the computer system is under the controller, and shows an installation set up primarily to reduce clerical costs in the controller's department, and to relieve the strain on the tab equipment. The second illustration shows the set-up for a large-scale EDP system installed for the purpose of improving the quality of information for management decision-making. In this set-up, the computer organization is a staff function reporting to the executive vice president, and acts as a service group to all other departments.

Advantages of this arrangement are the provision it affords for company-wide coordination of all work concerned with systems; and the ability of the analysts to examine problems without being influenced

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by a particular method of solution. In addition, this arrangement eliminates some of the inherent weaknesses of a system located under the controller. For example, the identification of the computer with top management "creates a climate in which it is easier to enlist and sustain the cooperation and support of department heads." It makes it possible to select the best qualified executive in the company to direct the installation. And such problems as scheduling and selection of applications are more easily resolved at the top management level.

THE AUDITOR ENCOUNTERS COMPUTERS

Charles E. Grody, New York Life Insurance Co.
THE INTERNAL AUDITOR, March 1959; pages 31-44

The author suggests that the ideal set-up for an internal auditor is to report to the Board of Directors either directly or through an Auditing Committee of the Board. He believes that the auditor should not have responsibility for the development and installation of procedures, electronic or otherwise. He sees the auditor, however, giving valuable service to those charged with such operations in planning adequate controls for the system. To do so, the auditor must have a fairly good knowledge of the electronic system and equipment. After the system is in operation, the auditor will need to develop his audit programs while avoiding becoming a stumbling block in the progress of the new system.

Master records and historical records may be reconstructed for control

The new methods tend to develop obscurity in the audit trail, particularly in the case of the master records and the historical records. However, master records may be printed at intervals, although care must be taken so that such print-outs will be spaced to avoid costly interruption of processing.

Historical records may be reconstructed if necessary from basic source documents and cross-referenced transaction registers. Since such print-outs would be needed rarely, the effort needed to reconstruct them is not a great factor.

Control may be imposed at three areas: outside the computer area, such as input and output data; those controls included in the EDP programs; and controls built into the hardware. The auditor should be well aware of the latter type of controls. For controls outside the computer, the auditor can establish sound business practices at the machine console; he can see that persons other than those performing the processing do such things as follow up exceptions and verify control totals; he can take steps to protect magnetic tape files from loss, mutilation, and mishandling. This would include providing for a comprehensive indexing system, and a trained librarian, along with rules about who may have access to the tape files.

Within the computer program, the auditor may insert provisions for accumulation and verification of control totals by the computer, as

Auditor may include control points in computer program

well as comparisons, arithmetic verifications and editing, and analyses which were impractical by manual methods. The auditor should be advised of all program changes in order to protect his control provisions.

An example of the development of controls within a computer system is given. A checklist of control possibilities is the first step:

1. Is a record count available to control the records to be converted?

2. Is a dollar control maintained for the various classes of coverage?

3. Is the source of the data, relative to the record count and dollar controls, of a reliable nature?

4. Does the computer program provide for comparison of totals obtained from external sources with those accumulated during the processing?

5. Does the computer program provide for separate error routines which will clearly identify the type of error?

Check list for control points

6. Have adequate procedures been devised for investigation of errors and the ultimate correction of data?

7. Does the "test deck," which was devised to test the computer program, provide for all reasonable possibilities of condition?

8. Will there be a period of parallel operation with the previous system?

9. Does the computer program provide for multiple passes for calculations to limit the possibility of machine error?

10. Are check-point and restart routines included, in the event of machine breakdown or end of shift?

11. Is there a clear console operator's log providing for a course of action in any reasonable contingency?

12. Does the computer program provide for an accurate method of tape identification?

13. Will a central control be maintained over all records until the conversion is complete?

The following is a sample of some of the audit program steps:

1. Review the block diagrams, memory layouts and other supporting data relating to the proposed conversion. Summarize the basic plan and the control features.

Auditor's part in the systems design

2. Review the "test deck" which is to be used in the "debugging" of the computer program and ascertain the adequacy of the tests to be made by use of the "test deck."

3. Witness the "debugging" process and make notes of the results.

4. Review the system of internal control for both the external and internal elements of the procedure.

5. Examine the general control records established for the conversion and determine the adequacy thereof.

6. Examine the "print outs" of the converted material and compare the output record count with the controls previously established.

7. Review the printed results of the comparison of the old summary card (summarized from the last billing operation under the old system) with the summary card produced after the conversion process. Review for differences.

8. Obtain a copy of the detailed print out of the errors, if any. Follow through, on a test basis, to determine the adequacy of the steps taken for correction.

THE AUDITOR'S JOB IN THE COMPUTER ERA

BANKING, March 1959; pages 46, 130

Control of information must be established at its source. Some internal controls which have been applied here include the registration of source documents at the point of entry, pre-numbering and sequential use of entry tickets, and the establishment of predetermined proof totals of information entering the system. Another form of control is division of responsibility and authority, for example, control totals established by groups other than those operating the data processing center, and the operation of the data processing center as a service organization.

For maximum efficiency audit techniques should be adapted to the most satisfactory computer programs. This may involve a complete revision of the audit performance and the audit schedules. Since printing out frequent control information during processing is a costly and cumbersome process, audit requirements should be recognized during the programing stage and provided for at a minimum cost and with the least impairment to the over-all operation.

THE PROMISES AND PROBLEMS OF MECHANIZED CHECK HANDLING

BANKING, February 1959; pages 46, 47, 119, 120

Some questions which banks have been asking about the new bank automation developments are answered in this article. Some of these are:

Will we have to code our checks? No, but as banks start using the code, it will be increasingly difficult to avoid the trend.

Some questions banks are asking about the ABA specifications

Can we benefit from coding even if we don't plan to mechanize? Yes. The code will facilitate manual handling of checks, and checks will clear faster. Federal Reserve banks hope to have pilot installations by 1960. And it is possible that one day data processing centers will be set up to serve even the small banks within their area.

How will this affect us if we've already started to mechanize? Only minor adjustments will be necessary to tie present equipment to the check coding system.

Should we have our accounts numbered? It is wise to allow at least a year to establish account numbering before trying to code checks. After a good numbering system is established, it is necessary to do a good public relations job with the customers.

Must we change the form of our checks? Probably this will be necessary, in order to provide the free band at the bottom which is the location chosen for the standard coding.

Will our transit number or routing symbol be changed? Only about 100 banks will be asked to change their transit numbers in order to avoid duplications in the coding. The coding does not replace the usual fractional representation of the transit number and routing symbol printed on each check.

When can we start coding our checks? As soon as the final report of the Technical Committee has been released and a bank is set up to follow the coding system according to the standards. However, greater efficiency can come only when enough coded checks are being handled to make mechanization feasible. This is not expected before 1960.

What kind of equipment will we need? For check coding alone, an imprinter. Other equipment would have to meet particular needs of the individual banks.

Is the necessary equipment available? In general, manufacturers will be ready when the banks are ready.

How much will it cost? This will depend upon the amount of mechanization a bank wants.

MAJOR BREAKTHROUGH IN PAPER PROCESSING

MANAGEMENT AND BUSINESS AUTOMATION, March 1959; pages 15-20, 36-41

For those who have been unable to read a complete review of the research done by the banking industry on standardization of check-handling operations, this will provide an excellent opportunity. ((See DPD, April 1958, page 1: "Automation in Check Handling."))

DATA PROCESSING, 1958 PROCEEDINGS

Published by National Machine Accountants Association. $10.00

As proceedings go, this is above average, particularly in its physical attributes--a case-bound book of manageable proportions, with good clear typeset and wide margins. The book welcomes you to read, which is a detail many proceedings editors ignore.

The majority of the papers are "how-we-did-it" descriptions of punched card, 705, 650, or 305 RAMAC installations. One wonders if there was a reason for IBM dominating the conference. In a brief skimming-through, our eyes fell on a description of the present SPAN operation ((see DPD, March 1958, page 9: "Proceedings of I. A. S. A.")), a cooperative venture which has been particularly fascinating to us.

Systems based on information files

One paper in particular seemed to have some fresh ideas--"Storehouse Material Accounting with a 705" is an account of the Esso Standard Oil Company's "EDPM Master Plan." This consists of seven projects which are, essentially, seven basic information files, which are integrated with each other through their interdependent inputs and outputs. The seven projects are as follows:

P--Payroll and Personnel--mechanization of all information pertaining to employees. The payroll portion involves manpower planning and includes preparation of predicted daily work schedules, a day in advance, for all wage earners. Corrections to prediction are fed back to the 705 to adjust the prediction to actual, thus permitting the accumulation of actual hours, shifts and rates worked. This history record is then used for the preparation of pay checks, payroll registers, tax registers, etc. The personnel inventory portion provides a basic record for each employee for the accumulation of all personnel history, statistics, seniority lists, etc.

M--Material and Stores--mechanization of stock level control records, automatic purchase order preparation and follow-up, automatic invoice verification and preparation of accounts payable checks.

S--Sales and Shipping--customer order data and shipping data processed with maximum mechanization, including scheduling of lubricating oil blending and grease manufacture, scheduling of container

filling operations, optimization of package warehouse facilities and scheduling of shipping. Automatic preparation of shipping papers, package inventory reports, customer invoices, sales statistical reports and sales accounting records.

O--Operations analysis--mechanical preparation of operating data, product and crude oil inventories and laboratory data; accumulation of historical operating information for use in operations research studies.

A--Fixed assets--mechanization of fixed asset reports and records, eliminating 30,000 manually posted cards.

F--Financial and cost--general accounting and financial and cost report preparation, production of voucher registers and general and subsidiary ledgers.

R--Secondary reports--information for reports which can be produced directly from the other projects.

PROCEEDINGS OF THE FIFTH ANNUAL COMPUTER APPLICATIONS SYMPOSIUM

Armour Research Foundation, 1958. $3.00

Informative and interesting proceedings

Like an iceberg, most of the business and busy-ness of an EDP system lies below the unruffled surface of the cool, rectilinear equipment room. Compared with the general run of meetings, articles, books, and casual conversation about inventory applications or ingenious link-ups of data processing equipment, the ARF Symposium proceedings reveal a deeper kind of thinking than one usually finds. Its subject matter deals largely with the more esoteric aspects of programing and systems analysis in which management rarely participates. This is brought out especially in the panel discussions which tie together the formal presentations.

Although the ARF Symposiums are attended and participated in by those who probe the potentialities of programing, persons who are in the position of ordering and using the end product of a computer system would be well-advised to find out what goes on at these meetings.

Briefly, here are some of the subjects discussed in lively fashion, and recorded carefully and clearly in the proceedings. ((We are happy to see a great deal of editing has been done to clean up the extemporaneous and extraneous comments which clutter up most proceedings.)) On business applications:

1. A review of the purpose and direction of research undertaken by the banking industry.

2. A description of the Air Materiel Command information system.

3. The problems of information retrieval, and some methods and machines now in use.

4. A history of the development of automatic data processing in the Defense Department.

5. A resume of the proposed NCR 304 application at the Johnson Wax Co.

6. Character-recognition devices which the Reader's Digest has investigated.

7. Input-output bottlenecks caused by logical inflexibility and numerous media and formats rather than by slow speed.

On scientific applications: Discussions of use of medium-scale computers, numerical control of machine tools, computer service bureau for engineering firms, programing techniques, a visionary--but practicable--central all-purpose computing system, and automatic programing. Two panel discussions which relate the talks given in the two groups reveal some interesting opinions and attitudes by the participants.

NEW CONCEPTS—NEW THINKING—NEW IDEAS IN THE ELECTRONIC AGE

John J. Lynch, Prentice-Hall, Inc.
CREDIT EXECUTIVE, January 1959; pages 7-9

Electronic data processing will inevitably bring changes in concept and practice to credit managers. For example, EDP introduces genuine "ledgerless bookkeeping." This will eliminate the credit manager's ledger card which contains the information about a customer which is necessary for credit work. A good substitute, and one which the credit manager can have at hand constantly (unlike the ledger card which remains in the bookkeeping department), is the information he can glean from two reports printed out by the EDP system. These are the current status report (for example, an extra copy of the statement), and a record of sales volume by customer.

For the interchange of credit information, the credit manager will find "total credit" (obtainable from the sales volume report) a better indication of credit status than "high credit" which is the customary information given for credit status. While this is a radical departure from current custom, the author reminds credit men that exchange of credit information was, itself, a radical departure only a few decades ago.

((This is the best article we have yet seen on the credit function in an EDP system. This appears to have been a somewhat neglected field in the literature.))

HOW TO BEAT THE FORMS PROBLEM IN HIGH-SPEED PRINTERS

OFFICE EQUIPMENT & METHODS, March 1959; pages 23-25

High speed printers make paper forms-handling a problem. Paper takes a beating as it goes through the printer. For example, each time the paper moves to another line, it is subjected to a force 10 times the pull of gravity. Some of the research problems encountered by forms manufacturers are these:

-To feed paper into a machine which will withstand the repeated forward movement between printing cycles and maintain efficiency.

-To construct vehicles which will let forms progress through the machines without interfering with the printing device.

-To modify manifolding techniques to allow for the production of extra copies when needed.

Users of high speed printers are given these tips by the forms manufacturers to be considered during the planning stages of their EDP systems:

Storage and climate are considerations in forms purchase

-Do not plan for, nor try to order, extremely long continuous strings of forms to give a long uninterrupted printing time. Some of the boxes of stationery will weigh 100 pounds, making it necessary to move them with a hand-lift truck.

-Plan for the storage of forms before they go into use in the printer. Paper is affected by changes in humidity, so that changes in width along a continuous sheet can occur, throwing guide lines, columns, or boxes out of register.

-Temperatures affect the efficiency of carbon paper, which, if stored at temperatures much above 70° F for a long time may seep oil onto the forms and give poor copies.

-Have experts plan the forms as you plan your operations, so that one set of forms may be used to the maximum, cutting down on changing paper from job to job.

-Whenever possible, use standardized form widths to cut down the moving of the feeding device to accommodate different form widths between jobs.

-If this isn't possible, at least keep the left hand margin standard on all forms.

-"Plan on using as many multiple use forms as possible, printed so they can be used to create a number of different types of reports. On some reports certain columns can be ignored. It's possible that in all cases the headings of the various columns can be printed by the

machine. Perhaps only part of the paper need be used and two different documents for two different people can be created concurrently side by side. A prime example of this is shipping instructions and invoice forms to be snapped apart for use."

HOW TO DESIGN FORMS FOR THE MACHINES USED IN INTEGRATED DATA PROCESSING

Ray Marien, Olin Mathieson Chemical Corp.
OFFICE MANAGEMENT, February 1959; pages 21-23, 52-57.

Some practical hints are given for designing and printing forms for high-speed printers and other input and output equipment. This includes suggestions on economical use of paper, and economy of press runs, as well as ingenious placement of information on the forms for efficient operation. For example, combine the invoice and shipping form, side by side, with the shipping side including a three-part bill of lading set. In another example, invoices are printed side-by-side, with billing information printed twice on the 407, thus cutting the number of thicknesses needed by one half.

INTERLINE FREIGHT ACCOUNT SETTLEMENT BY TAPE

Three railroads, the Illinois Central, the Southern Railway, and the Union Pacific, have begun the practice of settling interline freight accounts by exchanging magnetic tapes containing the necessary information. This is possible because of the compatibility of the data processing installations of the three railroads. The settlement of freight accounts represents the largest exchange of information and the largest amount of paper exchanged among railroads. In the new procedure, the information on the tapes will be processed by the receiving railroad's EDP system, speeding up the process and cutting down on the error rate.

COMPUTERS—VITAL TOOL IN MARKET RESEARCH

MODERN RAILROADS, March 1959; page 75

A research group for the Traffic Executive Association--Eastern Railroads is using the Univac to assist in studies of commodities moving by rail. These studies will provide railroad traffic officers with accurate cost, production, and market data, which will help them discuss proposed rate changes intelligently with shippers. When a new rate is proposed for a commodity, the information may be processed by the computing system to determine how it would affect the railroad position. The computer produces the necessary cost and traffic data to back up the railroads' case before the ICC. Railroad officials believe this research will help them in their fight to become more competitive in rate making.

OCCUPATIONS IN ELECTRONIC DATA-PROCESSING SYSTEMS

U.S. Department of Labor, Occupational Analysis Branch of U.S. Employment Service.

Job descriptions of thirteen different types of jobs in EDP installations are presented, along with additional background information. The jobs covered are: card-tape-converter operator, coding clerk, computing analyst, console operator, data typist, electronics mechanic, high-speed-printer operator, programer, chief programer, project planner, supervisor, systems analyst, tape librarian. Job descriptions cover job definition, education, training and experience, special characteristics such as aptitudes, interests, temperaments, physical demands and working conditions. A copy of the report may be purchased for 25¢ from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C.

POSITIONS FOR HIGH SCHOOL GRADUATES IN DATA PROCESSING

Enoch J. Haga, Vacaville, California
COMPUTERS AND AUTOMATION, February 1959; pages 13-16

A survey of computer people revealed that many jobs in computer installations were open to high school graduates. These were mostly the clerical and operating jobs, although many companies indicated that high school graduates would be eligible for higher level jobs, depending upon interest, aptitude and ability revealed through company training programs.

((See DPD, November 1958, page 8: "Implications of Electronic Data Processing for Business Education in High School".))

AUTOMATION SALARY SURVEY

OFFICE EXECUTIVE, March 1959; pages 25-28

The National Automation Committee of the National Office Management Association has made a survey of salaries of personnel in the EDP field. About 200 companies with data processing installations were surveyed. Twenty-three job descriptions were provided. Replies were classified by installation sizes as small, medium, and large. In general, the larger installations had more job classifications and higher salary ranges. Top weekly average salary was $260 for director of the large EDP center. A comparable job in the medium size center was averaged at $215. Most frequently listed jobs were the director, the console operator, the keypunch clerk and the programer. Lowest paying jobs among all size installations were the Flexowriter and teletype operators and the librarians, with ranges from $55 to $68 per week. Salaries for programers averaged from $186 for a large installation programing manager to $117 for a staff programer in a medium size installation.

Systems Design

RANDOM ACCESS VS SEQUENCED PROCESSING

NAVY MANAGEMENT REVIEW, February 1959; pages 4-8

"The appeal of having information at your fingertips is almost emotional. There is a sense of security and managerial well-being that goes with the knowledge that needed information can be had immediately."

This article explores the factors which influence the choice between random access or sequenced processing methods. This choice must derive from an analysis of cost and speed for the particular problem at hand. Accuracy for either system "may be achieved to any degree desired through the expenditure of time and money and is therefore eliminated from consideration here." In comparing machine systems, five elements of speed are identified:

Make a choice through speed requirements

1. Total processing time: "This is the time required to do the entire job. Obviously, if the machine cannot do the entire job in twenty-four hours a day, it is unacceptable. Once the total processing time for a job is known, a measure of extra capacity for emergency and expansion can be obtained by determining the extra time available weighted by the speed of the machine....[Note that] a random access machine which must be available for transactions at any time during an eight hour day may have to stay loaded with the data and program for those transactions during that time. Therefore, it may not be available for other work during the eight hour period even though the actual processing time may be less than eight hours. In these circumstances, the total processing time must be taken to be the period during which the machine is unavailable for other work."

2. Average routine cycle time: "In many problems, especially when in-line processing is under consideration, the time it takes from receipt of a transaction until it has been acted upon and dispatched is critical. This time may well vary from transaction to transaction, and it becomes desirable to obtain the average cycle time for a transaction which has been assigned no special priority."

3. Maximum routine cycle time: "This is the longest time any one routine transaction might take to be processed. This could be stated as the longest possible period between receipt and dispatch of a transaction which has been assigned to no special priority. This factor will usually determine the extent of emergency input. If routine cases using EDP can be processed in every instance faster than emergency cases in the system now being used, perhaps there will no longer be a need for an emergency procedure."

Time and cost measurements

4. Average emergency cycle time: "If priority processing is still needed in the system under consideration, the average length of time it takes to handle a transaction on an emergency basis is of interest."

5. Maximum emergency cycle time: "This factor would be the longest time required to process an emergency case. Perhaps thirty minutes...is the most time that would ever be needed...."

The factors which operate to determine the time and cost measurements are suggested as follows:

1. Size of workload. "Generally a large volume of input data works in favor of sequenced processing because the frequency with which there are changes to process against records on the master tape would be high. Practically every master record would have some activity, in other words."

2. Frequency with which input data arrives. "If input data arrives once each day in a big batch, it would work in favor of sequenced processing. Even if data arrives at small and regular intervals, if batching is necessary for some preliminary processing such as key punching, a random access advantage is lessened. However, if data arrives in small segments at regular intervals and is immediately introduceable to the machine, random access processing gains an advantage because there is no time wasted in accumulating data to sort."

3. Size of record. "This is important for two reasons. First, there are limitations imposed by the size of random access memories. The size of storage (in comparison with the size of the file to be stored) will affect the extent of internal overflow problems and the necessity of maintaining a separate system for some file items. Second...the size of the record will affect the access time ...of a random access system. Record size will affect processing time of sequenced systems."

4. Organization of file. "This factor will also affect the access time of a random access system. For instance, if a large percentage of the activity occurs on a small portion of the file, random access processing is able to take advantage of this characteristic by grouping the popular items. Sequenced processing is less able to take advantage of this characteristic."

Numbering systems affect choice of system

5. Characteristics of numbering system. If the numbering system for the records can be designed for the convenience of the machine processing, storage problems on the random access equipment will be more easily solved. Arbitrary systems (such as mixed numerical and alphabetic characters) are better adapted to sequenced processing, because of the difficulty of relating a number of this nature to a memory address. The numbering system characteristics affect the ability to pack information into the random access memory.

6. Frequency of additions and deletions to file. "The handling of numerous increases and decreases in the file, especially when additions fall within the numbering scheme rather than at the end, works to the disadvantage of random access processing."

7. Sorting time for a sequenced processing machine. "The sequenced machine must answer the access time advantage of the random machine through rapid sorting ability. This is especially important when more than one set of records must be updated for each input item."

8. Degree to which input is already sorted. "The advantage of a random access machine is lessened if data arrives in a meaningful pattern rather than in random order, thus cutting the time which must be devoted to sorting."

9. Number of things which must be changed or consulted as a result of a single input item. "The extent to which each item must be posted to several different files which are necessarily incompatible in numbering system is a telling factor in favor of random access processing."

10. Frequency of emergencies. "All necessary inquiries as well as requirements for complete processing of an item on an emergency basis should be considered within the framework of this factor. The more emergencies there are, the greater the need for random access processing--up to a point when emergencies occur so frequently that they become routine and are slowing each other down. Then sequenced processing gains an advantage."

"Fortunately the choice between random access and sequenced processing necessarily reduces to making a choice between actual hardware as opposed to a determination of random access vs sequenced processing philosophies preceding the selection of equipment."

ORGANIZING A NETWORK OF COMPUTERS

TECHNICAL NEWS BULLETIN, National Bureau of Standards, February 1959, pages 26-28

The Bureau's new NBS Pilot Data Processor ((see DPD; April 1959, page 10: "Organizing a Network of Computers))" is described in some detail. At the present time three computers have been linked together to work simultaneously on a single problem. The primary and secondary computers are used for the computation, while the third computer specializes in operations that control and interpret the data flowing between the system's internal memory and its external storage and display devices. It is expected that future developments of the network techniques will link larger numbers of independent machines in the performance of large tasks. "Such systems will inevitably be more loosely organized with respect to centralized control than the relatively

compact and self-contained machines of today. The dynamics of such loosely organized systems can probably be more effectively conceived of in terms of the group behavior of large numbers of independent units, randomly interacting, rather than as an individual completely prescheduled machine process. As such behavior can best be analyzed in statistical terms, the problems of system design will increasingly become statistically oriented problems."

Management Sciences

OPERATIONS RESEARCH FOR INDUSTRIAL MANAGEMENT

Dimitris N. Chorafas, IBM World Trade Corp., and The Catholic University of America
Published by Reinhold Publishing Corp., 1958. $8.75

This engagingly written book presents "a detailed explanation of the most recently developed operations research techniques used for executive decision-making with emphasis on so-called simulation studies." Included are problems related to financial allocation, transportation, inventory control, and production scheduling. Recent developments in methods of evaluating alternate management decisions are included also. The materials are presented in such a manner that those who do not have an extensive mathematical background are able to understand the import of the theories discussed. Systems engineers and others interested in the technical aspects of operations research will find material to their liking in the descriptions of game theory, linear programing, simulation theory, flow techniques, and matrix algebra.

Realistic approach: "better," not "best" system

In the introductory chapter, the operations researcher is given some advice on problem-solving, ending with the warning that "the analyst should approach the problem with the objective of finding a 'better' solution, rather than the best." Chapter 2 is devoted to the basic steps in building up a mathematical model. Example problems are: figuring the value of used cars, and designing an intraplant mail system.

In the discussion of simulation in chapter 3, an example problem happens to be the decision of whether to buy or rent an electronic computer, or to continue with the present methods. An interesting digression from the chapter's object of illustrating the use of simulation is the list of factors to be considered in evaluating the work to be handled by a computer. This includes: 1. the number of employees doing computing; 2. the number and nature of non-automatic computers in the organization; 3. the quantity of computing work; 4. the size of the organization (number of employees, amount of money the company is willing to invest in information-handling equipment).

Besides simulation, there are discussions and lively fictionalized examples of the use of games, linear programing and other well-known but not usually well-understood OR techniques. Chapter 9 is a complete case study in strategic gaming, and is, in fact, a fictionalized account of the American Management Association game ((see DPD: February 1958, page 6: "Top Management Decision Simulation")).

The workings of the game are demonstrated in a highly entertaining manner: five fictional companies with three top executives in each are scrutinized and reported on as they play the AMA game. Since each "company" has unique motives and decision-patterns, their actions lend themselves to the very revealing diary type of reporting. Rather than a cut-and-dried description of an experimental game, this chapter becomes an absorbing account of the way in which human personality can influence the most scientific planning and reporting.

Programing

AUTOMATIC PROGRAMMING—FACT OR FANCY?

H. N. Laden, C. & O. Railway Co.
MANAGEMENT AND BUSINESS AUTOMATION, February 1959; pages 29-35, 45

Following a description of automatic programing methods ((See DPD, April 1959, page 4: "Automatic Programming for Business Applications")), the author points out some advantages and disadvantages. Among the former:

The plus and minus sides

1. A saving in time and money in training.
2. Reduction in time and cost of coding.
3. Reduction in time and cost of debugging.
4. More rapid and accurate production of flow charts of individual routines.
5. Overall process chart more easily composed.
6. Reduction of cost and delay in conversion from problem definition and system design proposal to computer process chart.
7. Acceleration of procedures study, problem definition, and system design.

8. Cheaper and easier modification and upkeep of business system design.

9. Computer may be changed for new model with less expense in conversion.

10. One-shot business operations may be programed economically.

Automatic programing's negative side includes these points: "It will not provide basic fact-finding and will not test the validity of any conclusions which are likely to be drawn from these facts. It will not help analyze facts, reformulate problem definition, or reshape management objectives. It will not concoct new accounting principles and concepts. It will not sketch a new organizational structure and it will not invent any new methods and procedures. It will not devise manual clerical procedures, nor write standing instructions, nor train clerks. It will not help with labor negotiations. In fact, it is estimated that automatic programming has an impact on only about 15 to 25 per cent of the scope of computerization."

Some object to automatic programing because of the loss of computer time in preparing the program for the application to be run. Some programers will resist the retraining needed to define problems in this way. Although the manufacturer develops the automatic programing system, the considerable cost is passed on to the customer.

Management's selection of computers involves A-P

Four areas of management decision regarding a computer system involve an evaluation of automatic programing. These are:

1. The choice of alternative EDP systems. Automatic programing techniques and libraries of routine should be considered part of the data processing system to be selected.

2. A study of the effectiveness of the automatic programing techniques, and their practicality in the particular EDP system in question.

3. Selection of the right automatic programing technique among the several available.

4. After the system has been selected, the day-to-day decision of using manual or automatic programing techniques for a particular programing assignment.

Although "savings from lower preparation costs for manpower and from earlier completion of the programming may be offset detrimentally by higher computer costs in computer generation of a program and in continuing operation," these excessive operating costs are of short duration on a computer procedure for a dynamic business.

Equipment

EMC—A NEW WAY OUT OF INVENTORY PROBLEMS

MANAGEMENT AND BUSINESS AUTOMATION, February 1959; pages 20-24

The Jordan Marsh Company of Boston is using a system called Electronic Merchandise Control to provide an accurate daily record of the movement of merchandise. A device which uses the Thermo-fax principle is wheeled among the merchandise racks and shelves. The punched price tags of the garments are inserted in the reading slot of the machine without being removed from the garments. The device reads the punched tags and records the information as black dots on sensitized tape. A data converter linked with standard key punch equipment converts the information on the tape into punched cards for conventional tab equipment. The tape is actually Thermo-fax copy paper in 5/8" tape form. About 600 tags may be recorded on one reel of tape. The device was developed by Automatic Records, Inc.

POINT-OF-SALE COMPUTER RELIEVES CASH REGISTER BOTTLENECK

MANAGEMENT AND BUSINESS AUTOMATION, March 1959; page 47

Matronics, Inc. of New York has developed the Mastor system, which operates as an integral part of any cash register. As a sale is recorded, the information normally entered by the clerk is automatically posted in the attached Mastor unit. At the end of the day a mobile readout computer is moved up to each register unit, and the information stored in the unit is transferred to the readout unit. The readout computer may be designed to give cumulative sales as well as daily information.

AUTOMATIC READING

DATA PROCESSING, January-March 1959; pages 10-17

Solartron Electronic Group Ltd., of England, has designed a machine which reads information directly from a cash register tally roll at about 250 characters a second. It can be used to operate a sorter, tape or card punch, or for input directly to a computer. The first commercial installation will be in the Boots Pure Drug Company Ltd. ((see DPD, October 1958, page 11: "A Case Study in Commercial Electronic Data Processing")), which has ordered 1000 specially modified cash registers. Eventually, 1300 branches of the drug company will be equipped with the registers. A special type-face has been designed for the system.

NEW ELECTRONIC READER SPEEDS DATA INPUT INTO COMPUTER

MANAGEMENT AND BUSINESS AUTOMATION, February 1959; page 25

Sweda Cash Register, Inc. has developed a reading device, the E-3 Electronic Strip-Reader, which can read the audit strip from a cash register at 100 lines per second. The device can then supply the information on magnetic tape, paper tape, punched cards, or directly to an electronic computer.

EDP—AT DRUG TRADING

Glenn H. Kivell, Drug Trading Company Ltd., Toronto, Canada
JOURNAL OF MACHINE ACCOUNTING, February 1959; pages 12-16

The Drug Trading Company has placed its entire inventory and order filling operation on an IBM 705. Its problem of entering orders into the system has been met with a specially designed card or tape-producing machine, ten of which will be constructed for the company's warehouses. The Automatic Coder consists of a console on which are inserted plastic index strips 3" x 3/4" representing the items carried by the firm.

The console accommodates seven units of 300 index tabs each. Two of these units are used for the 2000 fastest moving items. One unit is used for another 2000 medium fast items. Quantities are entered in standard units from a keyboard attached to the operator's chair. As the operator reads, or hears the orders (via telephone or recording), he depresses the appropriate key on the console for each item, and enters the quantity on his keyboard. The code for the item is automatically set up in the unit, which then punches a card with the item code and quantity and the order number from the customer card. ((The author failed to mention how this latter number is entered.))

INDUSTRY HIGHLIGHTS

Prentice-Hall Report on Business, March 7, 1959

Electronic processing equipment sales will increase between 15 and 20% in 1959, with orders climbing 20 to 30%. The reasons given are: defense spending on computers will soar; more firms are marketing big- and medium-size computers; improvements are being made in computer capacity, reliability, and workable applications; and the export market will continue to expand. Intense competition in the field will force manufacturers of equipment to pay more attention to the needs of smaller businesses. This competition will benefit users because price increases will be restrained; stripped-down, cheaper models will come out; better quality machines, more help in proper use, and better servicing will be essential as sales boosters; and new product development will be spurred.

Meetings

Western Systems Conference, sponsored by Systems and Procedures Association and its Los Angeles Area Chapters

Date: May 14, 1959
Place: Los Angeles (Statler Hilton Hotel)

ORSA National Meeting

Date: May 14, 15, 1959
Place: Washington, D. C. (Shoreham Hotel)
Information: Operations Research Society of America, Mt. Royal & Guilford Ave., Baltimore 2, Md.

Fourth Annual Electronic Data Processing Conference, sponsored by local chapters of AIEE, SAM, Society of CPA's, NMAA, etc., and University of Alabama

Date: May 14, 15, 1959
Place: University of Alabama
Information: Gordon E. P. Wright, Director of Commerce Extension Services, University of Alabama, P. O. Box 2987, University, Alabama

"Expanding Horizons of Industrial Engineer," National Conference, American Institute of Industrial Engineers

Date: May 14-16, 1959
Place: Atlanta, Georgia (Biltmore Hotel)
Fee: Members, $39.50; non-members, $49.50. (Single event fees also available)
Information: AIIE, 145 North High Street, Columbus 15, Ohio

NOMA Conference and Exposition

Date: May 24, 27, 1959
Place: New Orleans, Louisiana (Roosevelt Hotel)
Information: W. H. Latham, NOMA, Willow Grove, Pennsylvania

First National TIMS Meeting (The Institute of Management Sciences)

Date: June 4-6, 1959
Place: Chicago, Illinois (Congress Hotel)
Information: Harold H. Cauvet, The Institute of Management Sciences, 250 North Street, White Plains, New York

International Conference on Information Processing

Date: June 13-23, 1959
Place: Paris, France (UNESCO House)
Information: U. S. Committee for the First International Conference on Information Processing, Box 4999, Washington 8, D. C.

International Accounting Conference

Date: June 21-24, 1959
Place: New York (Waldorf-Astoria)
Information: John L. Doran, National Association of Accountants, 505 Park Avenue, New York 22, N. Y.

British Computer Society First Annual Conference

Date: June 22-25, 1959
Place: Cambridge, England
Information: British Computer Society, c/o University Math. Lab. Corn Exchange Street, Cambridge, England

NMAA National Conference

Date: June 24-26, 1959
Place: St. Louis, Missouri (Chase-Park Plaza Hotels)
Information: National Machine Accountants Association, 208 South Main Street, Paris, Illinois

Sixth Annual Symposium on Computers and Data Processing, sponsored by Denver Research Institute

Date: July 30, 31, 1959
Place: Estes Park, Colorado (Stanley Hotel)
Program: Four half-day sessions devoted to each of following: Components, Logical Design, Computer Design, Systems Organization
Information: Denver Research Institute, University of Denver, Denver 10, Colorado

1959 ACM National Conference

Date: Summer, 1959
Place: M. I. T.
Information: F. Verzuh, Massachusetts Institute of Technology, Cambridge, Mass.

ISA Conference

Date: September 21-25, 1959
Place: Chicago, Illinois
Information: Instrument Society of America, 313 Sixth Avenue Pittsburgh 22, Pennsylvania

International Automation Exposition-Congress

Date: November 16-20, 1959
Place: New York (Trade Show Bldg.)
Information: Richard Rimbach, 845 Ridge Ave., Pittsburgh 12, Pa.

Training

Basic Programming for Medium-Size Computers in Business (IBM 650)

Date: June 8 through July 29, 1959, 6:15 p.m.
Place: Management Institute, New York University
Information: Dr. D. S. Philipps, Director, The Management Institute, New York University, Washington Square, New York 3, N. Y.

Automation in California, A Conducted Tour of Practical Applications

Date: June 15-27, 1959
Place: Tour leaving San Diego, and visiting EDP installations and computer manufacturers in Los Angeles, Pasadena, San Francisco, Palo Alto, and other points
Fee: $125 (including rooms, but excluding meals)
Registration deadline: April 15, 1959
Information: Dr. E. Dana Gibson, San Diego State College, San Diego, California

Two-week course for practicing engineers in scientific and engineering computation

Date: July 6-17, 1959
Place: Case Institute of Technology, Cleveland, Ohio
Fee: $375
Information: Dr. James R. Hooper, Jr., Director of Special Programs, Case Institute of Technology, Cleveland 6, Ohio

Industrial Engineering Seminars, Cornell University

Date: June 16-19, 1959
Place: Cornell University, Ithaca, New York
Seminars on Industrial Management, Manufacturing Engineering, Engineering Administration, Small Plant Management, Methods and Work Measurement, Computers in Production Planning, Applied Industrial and Engineering Statistics, Statistical Aspects of Component Reliability. Also general sessions.
Information: Andrew Schultz, Dept. of Industrial and Engineering Administration, Upson Hall, Cornell University, Ithaca, New York

University of Michigan Engineering Summer Conferences, including these two courses of interest to programing and systems engineering persons: "Computer Programming and Artificial Intelligence," and "Foundations and Tools for Operations Research and the Management Sciences." Other courses are designed particularly for the computer design engineer. Fee for each conference mentioned above is $225. Dates for each are June 29 through July 10, 1959. For information, write to: Engineering Summer Conferences, 2038 East Engineering Building, University of Michigan, Ann Arbor, Michigan.

"Electronic Data Processing for Business and Industry (Course 10) presented by Richard G. Canning

Date: July 27-31, 1959
Place: New York (Barbizon Plaza Hotel)
Fee: $250
Program: Emphasis on the applications aspect of electronic data processing. Four guest lecturers on specific applications.
For whom: Management personnel charged with setting up an EDP system
Information: Richard G. Canning, 1140 South Robertson Blvd., Los Angeles 35, California

"Frontier Research in Digital Computers," two-week summer conference

Date: August 17-28, 1959
Place: University of North Carolina, Chapel Hill, N. C.
Courses: Introductory course, "Modern Uses of Digital Computers," for beginners in the field
Advanced courses: "Advanced Numerical Analysis"
"Automatic Programming and Artificial Intelligence"
Fees: Introductory course, $150; Advanced courses, $200
Visiting lecturers include professors from France, Germany, Russia, Switzerland and the United States
Information: The Director, Research Computation Center, University of North Carolina, Chapel Hill, N. C.

Comment

IF YOU WANT TO TALK BACK

We have had some indication from readers that they would like to have the opportunity to comment on some of the ideas expressed in DPD. Some of the articles we abstract or digest contain provocative and even milestone ideas. Although one use for the Comment section is to gather related information and interpret it from our experience, there are many facets of a subject which would benefit from other points of view.

Data Processing Digest's publishers, therefore, invite our readers to write letters about the general field of EDP, about articles digested in DPD, or about subjects discussed in Comment. When space permits, we will select appropriate letters for publication.

CORRECTION

The article "Paper Tape Input for the IBM 650" which was digested in the March issue on page 13 was listed as appearing in DATA PROCESSING. This should have read DATA PROCESSOR, a publication of the IBM Corporation.

DATA PROCESSING is a new publication published by Iliffe & Sons Ltd., London, England.

References

The publishers of books and periodicals mentioned in this issue of DATA PROCESSING DIGEST are listed below for your convenience in writing for more complete information.

Academic Press Inc.
111 Fifth Ave.
New York 3, New York

Armour Research Foundation
10 West 35th St.
Chicago 16, Illinois

Banking
12 East 36th St.
New York 16, New York

Chemical Week
330 West 42nd St.
New York 36, New York

Computers and Automation
815 Washington St.
Newtonville 60, Mass.

Credit Executive
71 West 23rd St.
New York 10, New York

Data Processing
Iliffe & Sons
Dorset House
Stamford Street
London SE1, England

Henry Holt and Co., Inc.
383 Madison Ave.
New York 17, New York

Internal Auditor
120 Wall St.
New York 5, New York

Journal of Machine Accounting
208 South Main St.
Paris, Illinois

Management and Business Automation
600 West Jackson Blvd.
Chicago 6, Illinois

Modern Railroads
201 North Wells St.
Chicago 6, Illinois

National Machine Accountants Assoc.
208 South Main St.
Paris, Illinois

Navy Management Review
Supt. of Documents
U.S. Government Printing Office
Washington 25, D. C.

Office Equipment and Methods
Maclean Hunter Publishing Co. Ltd.
University Avenue
Toronto, Canada

Office Executive
National Office Management Assoc.
Willow Grove, Pennsylvania

Prentice-Hall, Inc.
Englewood Cliffs, New Jersey

Reinhold Publishing Corp.
430 Park Avenue
New York 22, New York

Technical News Bulletin
Supt. of Documents
U.S. Government Printing Office
Washington 25, D. C.

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